

AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0001] at page 1, lines 6-13, with the following amended paragraph:

The following applications disclose related subject matter: U.S. application Ser. No. 10/627,274(Attorney Docket No. 200208414-1), filed July 25, 2003(~~on the same day as this application~~) and entitled, "Determination of One or More Variables to Receive Value Changes in Local Search Solution of Integer Programming Problem"; and U.S. application Ser. No. 10/627,324(Attorney Docket No. 200209179-1), filed July 25, 2003(~~on the same day as this application~~) and entitled, "Determining Placement of Distributed Application onto Distributed Resource Infrastructure"; the contents of all of which are hereby incorporated by reference.

Please replace paragraph [0004] at page 1, line 29, to page 2, line 2, with the following amended paragraph:

A method of the prior art uses parameters for individual nodes to determine a placement of the services onto the nodes. Such parameters include processing and storage capabilities of the nodes. ~~Services are placed onto the nodes so that processing and storage requirements of the services on a particular node do not exceed the processing and storage capabilities of the node.~~ This method, however, does not consider relationships among the nodes or among the services in the determination of the placement of the services onto the nodes.

Please replace paragraph [0007] at page 2, lines 12-24, with the following amended paragraph:

The present invention is a method of determining a placement of services of a distributed application onto nodes of a distributed resource infrastructure. In an embodiment of the present invention, a placement indicator for a specific service is provided. Communication constraints between node pairs are also provided. The communication constraints ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair. Constraints can be expressed for preventing unwanted placements. Preferences can be

expressed for preferring specified placements. Each term of the sum of transport demands comprises a product of a first placement variable, a second placement variable, and the transport demand between the services associated with the first and second placement variables. The placement indicator, the communication constraints, and an objective comprise an integer program. A local search solution is applied to solve the integer program, which determines the placement of the services onto the nodes.

Please replace paragraph [0027] on page 5, line 28, to page 6, line 7, with the following amended paragraph:

An alternative distributed resource infrastructure is illustrated schematically in Figure 6. The alternative distributed resource infrastructure 600 comprises first through fourth nodes, 601..604, and fifth through Nth nodes, 605. Mathematically, the first through Nth nodes are expressed as  $n \in \{1, 2, 3, \dots, N\}$ . Each pair of the nodes has an associated transport capacity. For example, a first transport capacity  $ct_{12}$  represents communication bandwidth between the first and second nodes, 601 and 602. A transport capacity matrix  $Ct$  lists the transport capacities between the first through Nth nodes, 601..605, as follows:

$$Ct = \begin{pmatrix} - & ct_{12} & ct_{13} & .. & ct_{1N} \\ ct_{21} & - & ct_{23} & .. & ct_{2N} \\ ct_{31} & ct_{32} & - & .. & dt_{3N} \\ .. & .. & .. & - & .. \\ ct_{N1} & ct_{N2} & ct_{N3} & .. & - \end{pmatrix}$$

Please replace the Abstract, with the following amended Abstract:

A method of determining a placement of services of a distributed application onto nodes of a distributed resource infrastructure. In an embodiment of the present invention, a placement indicator for a specific service is provided. Communication constraints between node pairs are also provided. The communication constraints ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair. [[ . ]] Constraints can be expressed for preventing unwanted placements. Preferences can be expressed for preferring specified placements.

Each term of the sum of transport demands comprises a product of a first placement variable, a second placement variable, and the transport demand between the services associated with the first and second placement variables. The placement indicator, the communication constraints, and an objective comprise an integer program. A local search solution is applied to solve the integer program, which determines the placement of the services onto the nodes.